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RADIOACTIVE FOODCHAINS IN THE
SUBARCTIC ENVIRONMENT

Grant AT (30-1)-3446
United States Atomic
Energy Commission

Annual Report for the Period
Aug.15, 1969 - Aug.14, 1970

5010850 Principal Investigator

RADIOACTIVE FOODCHAINS IN THE
SUBARCTIC ENVIRONMENT

Progress Report

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Aug. 15, 1976 - Nov. 14, 1977

PREPARED FOR THE U.S. ENERGY RESEARCH AND
DEVELOPMENT ADMINISTRATION UNDER CONTRAT
No CH E(11-1)-3011

5010851

BODY BURDEN OF ^{137}Cs IN FINNISH LAPPS IN APRIL 1977

- Preliminary results -

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In the spring of 1977 the annual measurement of the ^{137}Cs body burdens of Finnish mountain Lapps was again carried out utilizing the same mobile whole-body counting laboratory described in previous reports and publications (1,2). Only those Lapps resident in Inari and occupied with reindeer herding were called to be measured. 31 subjects were counted, all of whom had also been measured in 1976. The results were calculated on the Burroughs 6700 computer of the University of Helsinki utilizing a spectrum stripping program and are presented in Tables 1 and 2. The average ^{137}Cs body burden for the whole group was 153 nCi (5.66 kBq) representing 90% of the average value for the same subjects one year previously, 170 nCi (6.29 kBq). For the reindeer herding group the decrease is somewhat larger, from 229 nCi (8.47 kBq) to 198 nCi (7.33 kBq) representing 86% of the 1976 average for the same subjects. Of 31 subjects 18 exhibit decrease in their individual ^{137}Cs body burdens, two persons retaining only 59% of the previous content, and 13 persons have increased body burdens, one subject having 2.7 times the amount found in 1976.

In Finnish Lapland reindeer herding is organized by districts. In the communities of Utsjoki, Inari and Enontekiö there are 10 such districts, "grazing associations". The changes in the ^{137}Cs body burden of the Lapps seem to be dependent on the reindeer herding district where they live, as indicated in Figure 1. The ^{137}Cs contents of the Lapps in the herding district of Muddusjärvi were increased in all cases

but one. Instead, in the herding districts of Paistunturi, Lansi-Inari and Ivalo the body burdens of ^{137}Cs were decreased.

The rate of increase or decrease in the ^{137}Cs body burden of the Lapps depends on the amount of reindeer meat consumed and on changes in the ^{137}Cs level of reindeer meat. According to an interview carried out during the whole body-counting measurements there has been in the winter of 1976-77 no significant change in consumption of reindeer meat compared to the consumption during the previous winter. The ^{137}Cs content of reindeer muscle in 1976 and 1977 are given in Table 3. The herding district where the animal has been slaughtered is also indicated in the Table. The average ^{137}Cs concentration in reindeer meat was 17.2 and 17.8 nCi/kg fresh wt. in 1976 and in 1977, respectively. Thus no significant change has taken place in the ^{137}Cs content of reindeer meat. The number of reindeer muscle samples analyzed has not been sufficient to find any regional differences in the ^{137}Cs level. However, the low ^{137}Cs content of reindeer muscle samples collected in the herding district of Paistunturi in 1977 seems to be in agreement with the decrease of the ^{137}Cs body burden in the Lapps of this district.

Two reasons can be mentioned which may bring about regional decrease in the ^{137}Cs body burden of the Lapps. In some reindeer herding districts the Lapps are forced during winter to feed reindeer on hay with significantly lower ^{137}Cs content than that of lichen. Another possible reason is that the Lapps of some herding districts consume during the winter period exceptionally large amounts of tissues of reindeer slaughtered in fall. The reindeer of a herding district are gathered for counting and slaughtering in fall, when the ^{137}Cs content of reindeer meat due to the summer diet is low. Reindeer do not feed on lichen during the summer period. In addition the biological half-time of ^{137}Cs in muscle of reindeer is only 27 d (3,4). Consequently, the ^{137}Cs content of reindeer meat at the end of summer can be only 10-20% of the content in spring.

ACKNOWLEDGEMENT

This investigation was supported by Contract No CH E(11-1)-3011 from the US ERDA.